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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,062

12/30/2003

Michael McSwiney

42P17283

9082

8791

7590

04/10/2008

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EXAMINER

TUROCZY, DAVID P

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

04/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/750,062	Applicant(s) MCSWINEY ET AL.	
	Examiner DAVID TUROCY	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,11,12 and 28 is/are pending in the application.
- 4a) Of the above claim(s) 4,5,7-9 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,12 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments, filed 2/27/2008, have been fully considered and reviewed by the examiner. The examiner notes the amendment to claims 1, 3, and 12, the cancellation of claims 2, 10, 13-27, and the addition of new claim 28. Accordingly claims 1, 3, 4-9, 11-12, and 28 remain pending in the instant application, with claims 4, 5, 7-9, and 11 withdrawn due to a restriction requirement.
2. In view of the amendment to the claims, the 35 USC 102 rejections and the obvious double patenting rejection have been withdrawn.

Response to Arguments

3. Applicant's arguments with respect to claims are directed at newly added limitations that were not present at the time of the final rejection and therefore are moot in view of the new ground(s) of rejection.

As for the applicant's arguments against Kaloyeros regarding the operating temperature, however, the applicant confirms Kaloyeros discloses temperatures of 550 or less as required by the claim when the reference discloses 200-1000°C. Specifically, Kaloyeros discloses 200°C is a known temperature for deposition and such is within the range as claimed. In response to the applicant assertion that Table 2 forecloses Kaloyeros from deposition temperatures below 550°C, the examiner notes the table is directed at a single process using a single precursor. Additionally, Kaloyeros discloses selecting the substrate temperature depending on the type of film to be deposited and the intended use of the coated substrate (column 3, lines 35-40).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, 6, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5968611 by Kaloyeros et al. in view of US Patent 6780476 by Horikawa.

Kaloyeros discloses a method of supplying halogen substituted hydrated silane and hydrazine to a chamber, applying thermal energy to the gases, setting an operating temperature of less than 550°C and depositing a silicon nitride by reacting the halogen substituted hydrated silane and hydrazine (abstract, column 4, and column 1, lines 5-15). Kaloyeros discloses using CVD to deposit the silicon nitride film as well as direct liquid injection (column 8), however, the reference fails to disclose mixing the precursors into an organic solvent in a second chamber coupled to the first chamber. However, Horikawa discloses a known method of improving CVD deposition by mixing the precursors into an organic solvent (figure 4), results in reduction of dust and adhesion of deposits to the supply conduit (Column 4, lines 20-25). Additionally, Horikawa discloses multiple arrangements for supplying the precursors, includes mixing each individually in an organic solvent and subsequently combining these solutions or mixing both the precursors in a single organic solvent chamber (see figures and accompanying text, column 10, lines 1-15). Horikawa discloses mixing the precursors into a single solvent

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and thereafter vaporizing the single mixture allows for a simple and non complex apparatus for deposition (column 10, lines 1-15). Therefore, it would have been obvious to one of ordinary skill in the art to have mixed the precursors in Kaloyeros in a single organic solvent as taught by Horikawa to reap the benefits of reducing dust and adhesion of deposits on the supply conduit as well as providing a simple and less complex apparatus for deposition. Additionally, Horikawa discloses that CVD can be improved by using an organic solvent mixed with the precursors and the claim would have been obvious because the technique for improving a particular class of devices, methods or products was part of the ordinary capabilities of a person of ordinary skill in the art, in view of the teaching of the technique for improvement in other situations. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d.

Claim 3: Kaloyeros, while preferring a haloethyl silane precursors, discloses dichlorosilane as a known and suitable silicon precursor in the formation of silicon nitride in the industry (Column 1, lines 5-10), and the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Claim 6: The limitations of this claim is addressed above.

Claim 28: Kaloyeros in view Horikawa fails to explicitly discloses the amount of precursors present in the organic solvent. However, it is the examiners position that the parameter of amount of each precursor is a known result effective variable. If the amount of silicon or nitrogen precursor is too low it would result in improper vaporization

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and deposition and too much of either precursor would result in improper formation of solution, improper film defects, and no added benefit of increased film deposition.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the amount of silicon and nitrogen in solution used in the process of Kaloyeros in view Horikawa, through routine experimentation, to deposit the desired silicon nitride film.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5968611 by Kaloyeros et al. in view of US Patent 6780476 by Horikawa and further in view of JP 59215732 by Yamazaki.

Kaloyeros in view of Horikawa disclose all that is taught above in paragraph 5, and discloses dichlorosilane as an appropriate silicon source of formation of silicon nitride films, but fails to disclose dibromosilane. However, Yamazaki discloses formation of a silicon nitride film discloses dichlorosilane and dibromosilane are known substitutes for each other. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967). Additionally the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaloyeros et al. in view Horikawa and further in view of US Patent 6767582 by Elers et al.

Kaloyeros in view of Horikawa disclose all that is taught above in paragraph 5, and Kaloyeros discloses nitrogen precursor of nitrogen, ammonia, or hydrazine, however, fails to disclose dimethyl hydrazine. However, Elers discloses a deposition of a nitride film using nitrogen precursors of ammonia, hydrazine, or dimethyl hydrazine. Therefore, Elers discloses dimethyl hydrazine is a known substitute for ammonia or hydrazine as the nitrogen precursor in a CVD reaction. The claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-

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2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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